CLAIMS

1. A preheated micro-reformer system comprising:

a reformer; and

a micro-reformer in fluid communication with said reformer, said micro-reformer being electrically preheatable.

2. The preheated micro-reformer system as in Claim 1, wherein said micro-reformer includes an electrically preheatable vaporizer disposed within said micro-reformer.

3. The preheated micro-reformer system as in Claim 2, wherein said vaporizer comprises a porous positive temperature coefficient of resistivity ceramic.

4. The preheated micro-reformer system as in Claim 1, wherein said micro-reformer includes a catalyst, said catalyst being electrically preheatable.

5. The preheated micro-reformer system as in Claim 4, wherein said micro-reformer includes a preheater, said preheater being electrically preheatable wherein said preheater preheats said catalyst by converting electrical energy into thermal energy.

6. The preheated micro-reformer system as in Claim 5, wherein said preheater comprises a catalytic material for reforming a fuel.

7. The preheated micro-reformer system as in Claim 5, wherein said preheater has a modulatable thermal energy transfer to said catalyst.

8. The preheated micro-reformer system as in Claim 1, further comprising;

an air heater disposed within said micro-reformer, said air heater being electrically preheatable.

9. The preheated micro-reformer system as in Claim 5, further comprising;

a flame arrester disposed within said micro-reformer between said preheater and said catalyst.

10. A method of using a preheated micro-reformer system comprising:

preheating said micro-reformer by converting electrical energy into thermal energy;

introducing fuel and air to said micro-reformer;

vaporizing said fuel; and

producing micro-reformer effluent.

11. The method of using a preheated micro-reformer system as in Claim 10, wherein said micro-reformer is preheated using an electrically preheatable vaporizer, and an electrically preheatable catalyst.

12. The method of using a preheated micro-reformer system as in Claim 11, wherein said electrically preheatable vaporizer comprises a positive temperature coefficient of resistivity ceramic.

13. The method of using a preheated micro-reformer system as in Claim 10, further comprising:

modulating a thermal energy transfer from said preheater to said electrically preheatable catalyst in said micro-reformer wherein said electrically preheatable catalyst is maintained at sufficient temperatures for inhibiting soot formation during operation.

14. An apparatus comprising:

a micro-reformer including a first zone and a second zone, said first zone being preheatable to a first temperature and said second zone being preheatable to a second temperature, said second temperature being higher than said first temperature.

15. The apparatus of Claim 14, wherein said first temperature promotes vaporization of a fuel air mixture, and said second temperature promotes production of reformate.

16. The apparatus of Claim 14, wherein said first zone is preheatable similarly to said second zone.

17. The apparatus of Claim 16, wherein said first zone is preheatable by converting electrical energy to thermal energy and said second zone is preheatable by converting electrical energy to thermal energy.

18. The apparatus of Claim 14, wherein said first zone is preheatable differently than said second zone.

19. The apparatus of Claim 18, wherein said first zone is preheatable by converting alternative energy sources to thermal energy and said second zone is preheatable by converting electrical energy to thermal energy.

20. The apparatus of Claim 18, further comprising a thermal barrier disposed between said first zone and said second zone, said first zone and said second zone being maintainable at different temperatures.

21. A method of using a preheated micro-reformer comprising:

preheating a first zone;

preheating a second zone to a temperature higher than said first zone;

vaporizing a fuel air mixture in said first zone; and

reforming said fuel air mixture in said second zone.

22. The method of using a preheated micro-reformer as in Claim 21, further comprising:

supplying electrical energy to said first zone, and converting said electrical energy to thermal energy.

23. The method of using a preheated micro-reformer as in Claim 21, wherein the step of preheating said second zone is from a different source of thermal energy than preheating said first zone.

24. The method of using a preheated micro-reformer as in Claim 21, further comprising:

maintaining said first zone and said second zone at different temperatures.

25. The method of using a preheated micro-reformer as in Claim 21, further comprising:

maintaining said first zone at a first temperature for vaporizing a fuel air mixture without precombustion; and

maintaining said second zone at a second temperature for reforming said fuel air mixture into preheated reformate.

26. The method of using a preheated micro-reformer as in Claim 21, further comprising:

maintaining said first zone at a first temperature for vaporizing a fuel air mixture without precombustion; and

maintaining said second zone at a second temperature to combust said fuel air mixture with excess air into hot gases.

27. A preheated micro-reformer comprising:

a means for preheating a first zone;

a means for preheating a second zone to a temperature higher than said first zone;

a means for vaporizing a fuel air mixture in said first zone; and

a means for reforming said fuel air mixture in said second zone.

28. The preheated micro-reformer as in Claim 27, further comprising:

a means for supplying electrical energy to said first zone, and converting said electrical energy to thermal energy.

29. The preheated micro-reformer as in Claim 27, further comprising:

a means for maintaining said first zone and said second zone at different temperatures.

30. The preheated micro-reformer as in Claim 27, further comprising:

a means for maintaining said first zone at a first temperature for vaporizing a fuel air mixture without precombustion; and

a means for maintaining said second zone at a second temperature for reforming said fuel air mixture into preheated reformate.